ONTARIO MINISTRY OF ENVIRONMENT
36936000024264

1966 OPERATING SUMMARY

RICHMOND HILL

water pollution control plant

TD
367
.A56
R53
1966
MOE

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

TD
367
.A56
R53
1966

Richmond Hill : water pollution
control plant.
81843

ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Members of the Richmond Hill Local Advisory Committee,
Town of Richmond Hill.

Gentlemen:

We are pleased to submit to you the 1966 Operating Summary for the Richmond Hill Water Pollution Control Plant, OWRC Project No. 57-S-6.

It is hoped that our joint participation in efforts to combat water pollution will have even more success in the coming year.

Yours very truly,

D. S. Caverly,
General Manager.

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ONTARIO WATER
RESOURCES COMMISSION

ONTARIO WATER RESOURCES COMMISSION
801 BAY STREET
TORONTO 5

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J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER
W. S. MacDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am happy to present you with the 1966 Operating Summary for the Richmond Hill Water Pollution Control Plant, OWRC Project No. 57-S-6.

The report offers a concise summary of operating data for the year and comparisons with previous years where these are applicable and significant.

Yours very truly,

BCPalmer

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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FOREWORD

● This operating summary contains complete information on the management of the project during 1966. It contains a concise review of the year's plant operation, significant financial details, and a visual presentation in graphs and charts of technical performance.

The information will be of value to interested parties in assessing the adequacy of the project at this time and its ability to meet future requirements.

The report is the result of co-operation by several groups within the Division of Plant Operations. These include the statistics section and the technical publications section. The Division of Finance and the draughting section of the Division of Sanitary Engineering were also closely associated with its publication.

The Regional Operations Engineer, however, has had the primary responsibility for the content, and will be happy to answer any questions regarding it.

CONTENTS

Foreword 1

Title Page 3

'66 Review 5

Project Costs 6

Operating Costs 7

Process Data 9

Conclusions . . . . Inside back cover

RICHMOND HILL

water pollution control plant

operated for

THE TOWN OF RICHMOND HILL

by the

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801 Bay Street Toronto 5

'66 REVIEW

The cost of operating the Richmond Hill Water Pollution Control Plant in 1966 was $51,339 compared to $50,984 in 1965. The cost of treatment was $86.51 per million gallons compared to $89.50 in 1965.

A total of 593.445 million gallons was treated compared to 569.643 million gallons in 1965, an increase of four percent. The average daily flow was 1.620 mgd which was slightly above the design plant flow of 1.6 mgd.

The treatment processes operated efficiently and provided the treatment expected. The average BOD and SS concentrations in the final effluent were within the OWRC objectives for secondary treatment plants.

PROJECT COSTS

NET CAPITAL COST (Final) Long Term Debt to OWRC	$359,420.34
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	$ 71,901.95
Net Operating	$ 51,338.70
Debt Retirement	7,253.00
Reserve	2,147.60
Interest Charged	20,220.59
TOTAL	$ 80,959.89

RESERVE ACCOUNT

Balance at January 1, 1966	$ 14,043.50
Deposited by Municipality	2,147.60
Interest Earned	776.55
	$ 16,967.65
Less Expenditures	1,441.22
Balance at December 31, 1966	$ 15,526.43

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY
JAN	2727.48	1153.50					21.41		20.60	1231.25
FEB	4153.04	1452.14		73.50	593.20	[illegible]	150.97		[illegible]	[illegible]
MARCH	4110.41	1494.09		57.73	[illegible]	443.05	29.47	[illegible]	[illegible]	[illegible]
APRIL	5175.93	2003.82		64.98	558.53	[illegible]	94.97		[illegible]	[illegible]
MAY	[illegible]	1504.61	30.78	86.79	477.97		40.42		166.72	35.65
JUNE	[illegible]	1749.16	162.00	92.59	580.31	87.32	200.86	39.11	97.13	1569.85
JULY	4825.21	1569.94	276.57	81.39	564.53	924.32	24.34	52.50	62.79	[illegible]
AUG	[illegible]	1714.50	240.13	37.53	355.59	365.40	104.23		83.82	1007.52
SEPT	4005.96	2460.34	65.60	62.14	510.00	596.61	150.61	9.98	101.78	[illegible]
OCT	4511.17	1469.15		67.59	527.12	456.75	33.60		96.02	1680.94
NOV	4643.21	1649.15		69.29	570.53	913.50	182.17		21.10	1237.47
DEC	[illegible]	1634.26		237.75	1094.23	456.75	239.00	5.88	[illegible]	2283.27
TOTAL	51339.70	20994.88	775.08	931.38	[illegible]	5602.05	1303.05	219.09	1030.58	13860.22

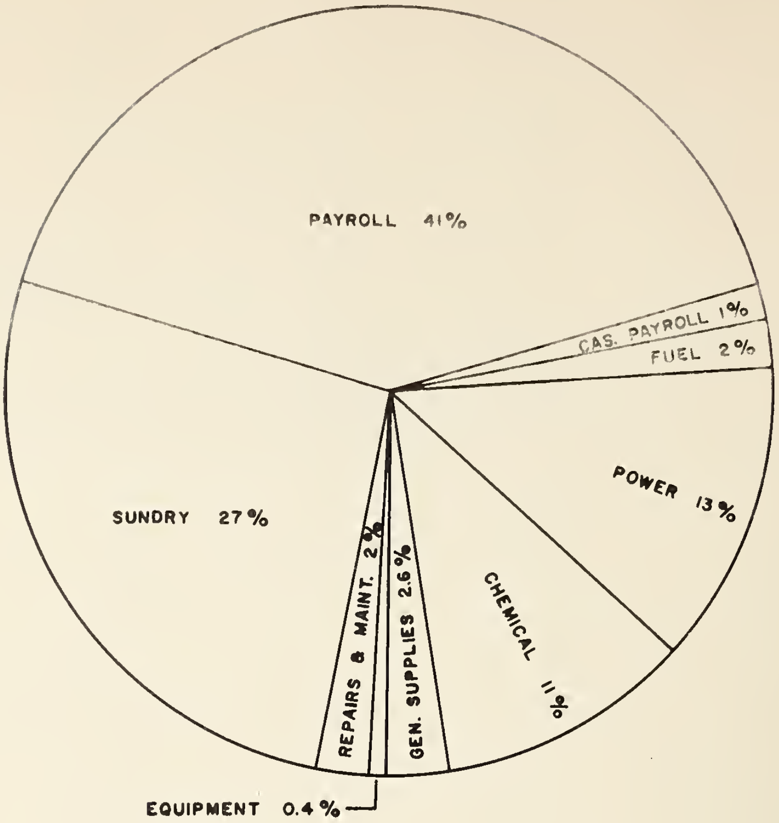
* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE $11400.49

YEARLY OPERATING COSTS

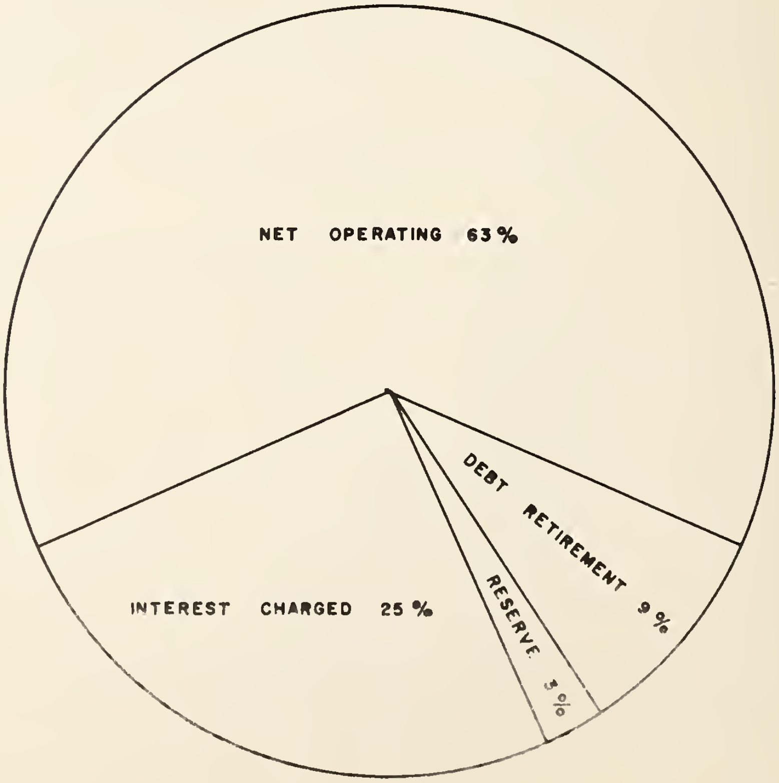
YEAR	M.G TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1961	205.53	$44475.00	* $ 9.32	$216.50	14 2/3 CENTS
1962	316.02	$44420.00	$ 9.32	$140.50	7 1/2 CENTS
1963	331.36	$42954.00	$ 9.01	$129.50	6 CENTS
1964	472.211	$51049.00	$10.69	$108.10	6 CENTS
1965	569.643	$50984.00	$10.34	$ 89.50	4 CENTS
1966	593.445	$51339.00	$10.30	$ 86.51	5 CENTS

* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

1966 OPERATING COSTS

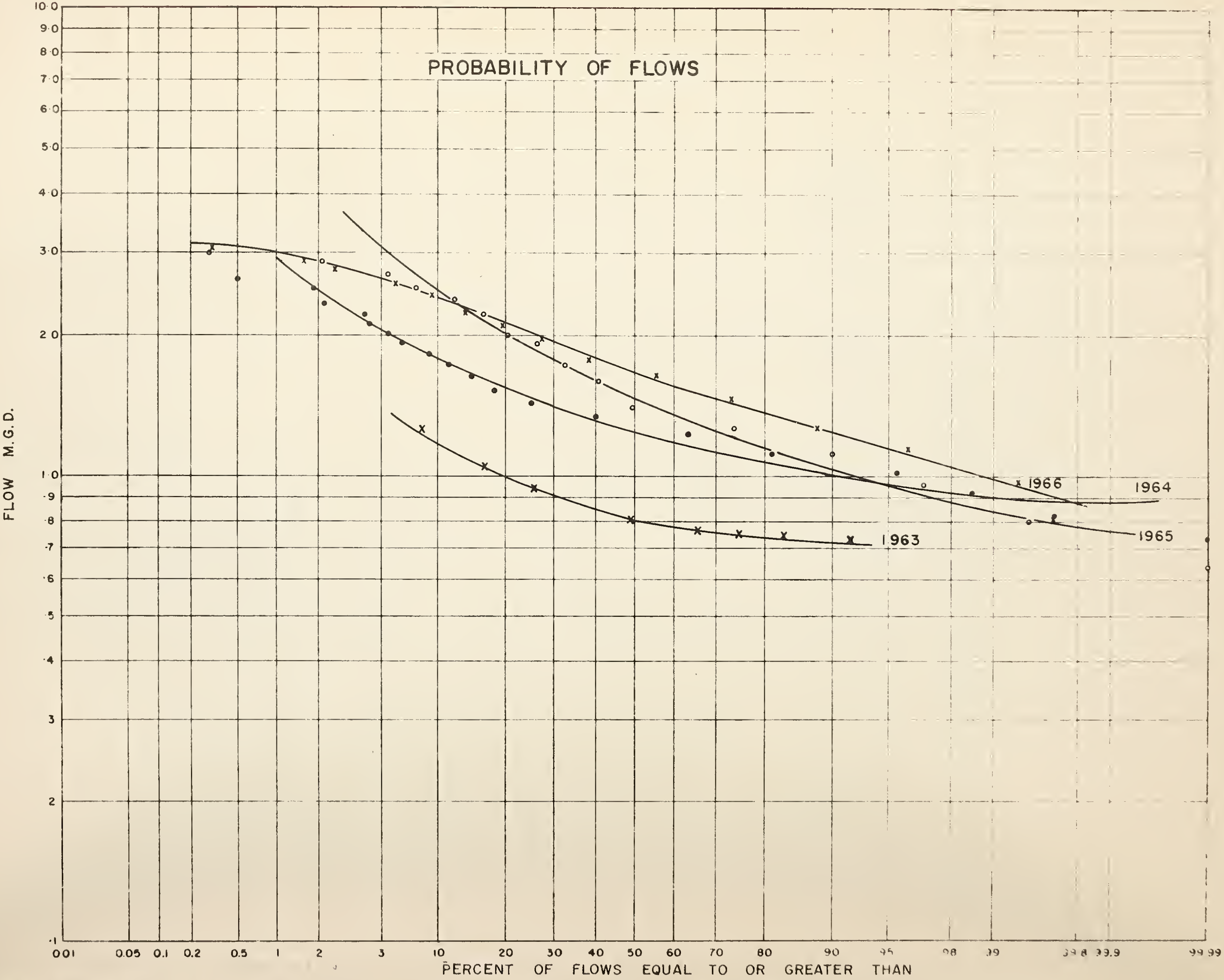


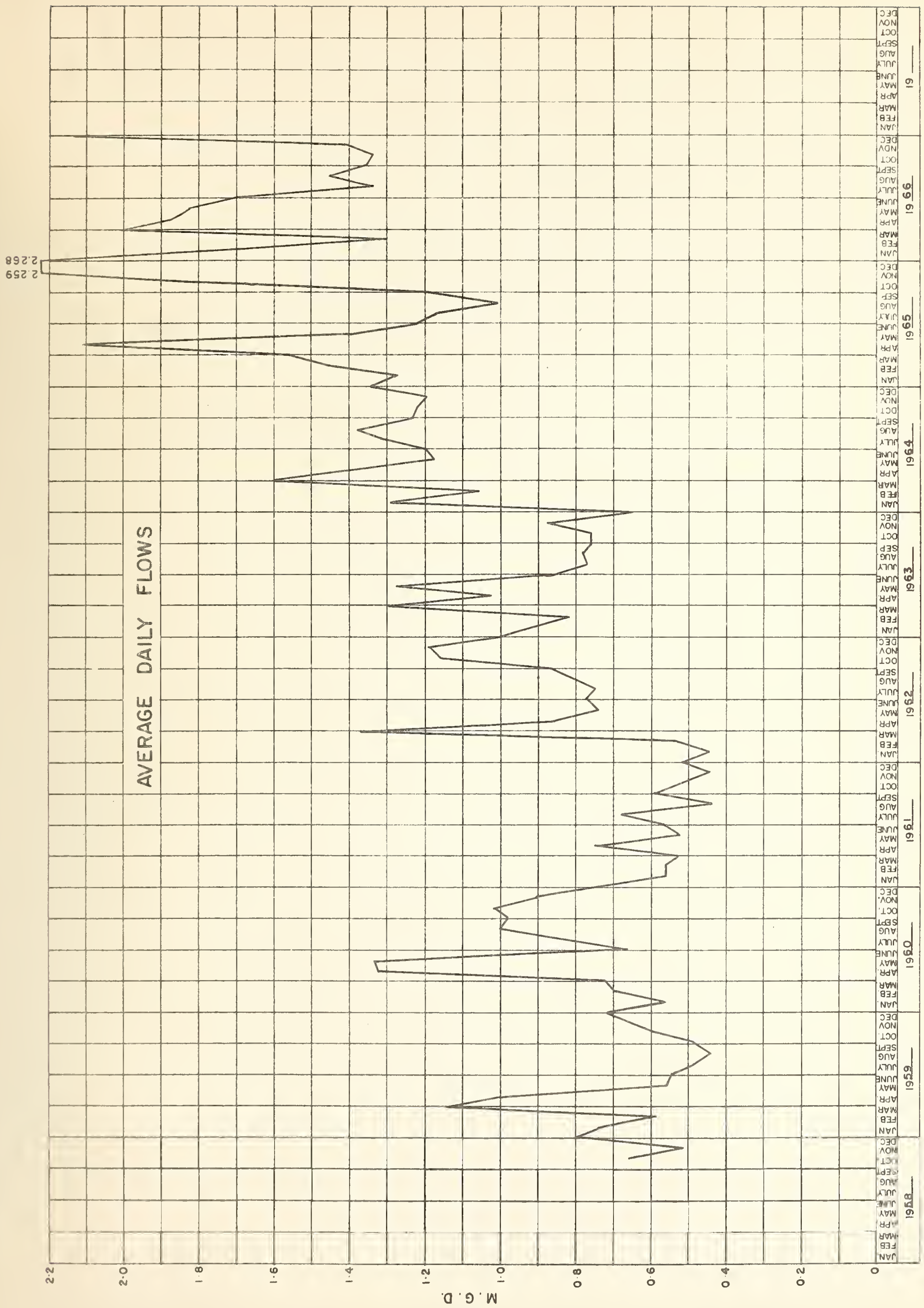
TOTAL ANNUAL COST

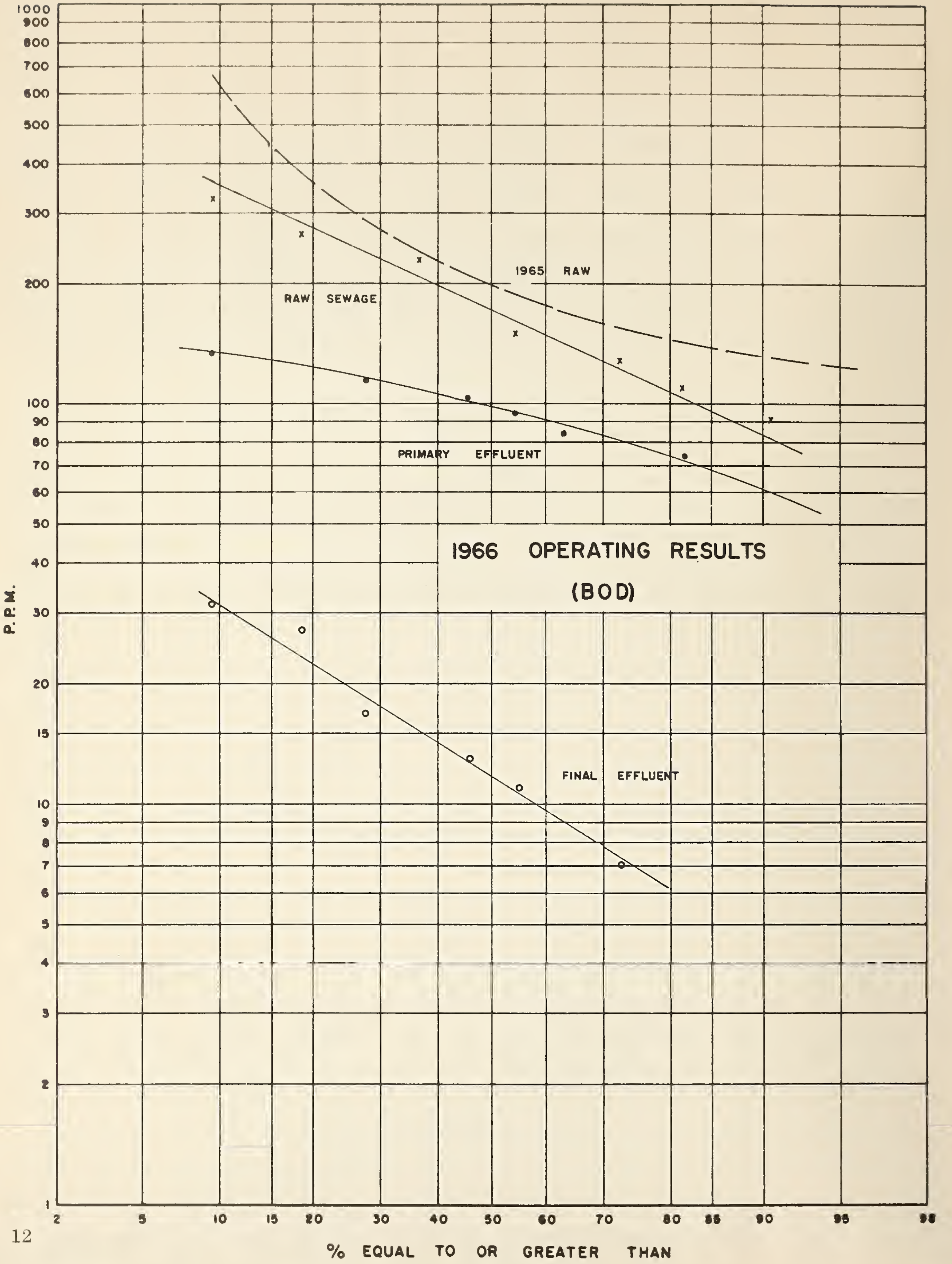


Process Data

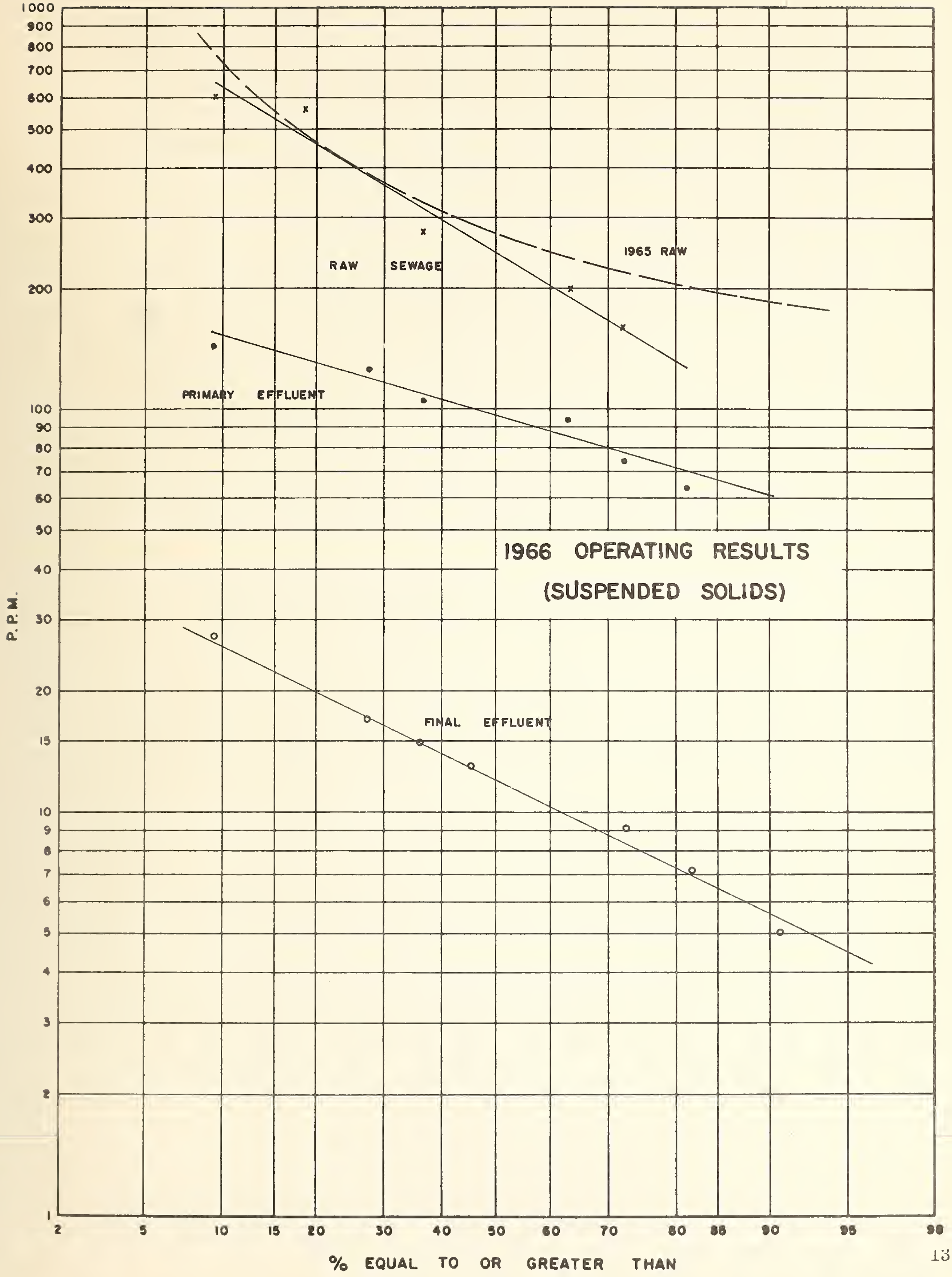
A total of 593.445 million gallons was treated during the year. This represents an average daily flow of approximately 1.620 mgd compared to 1.560 mgd in 1965, an increase of four percent. Also 56 percent of the time, flow was equal to or greater than the design flow of 1.6 mgd.

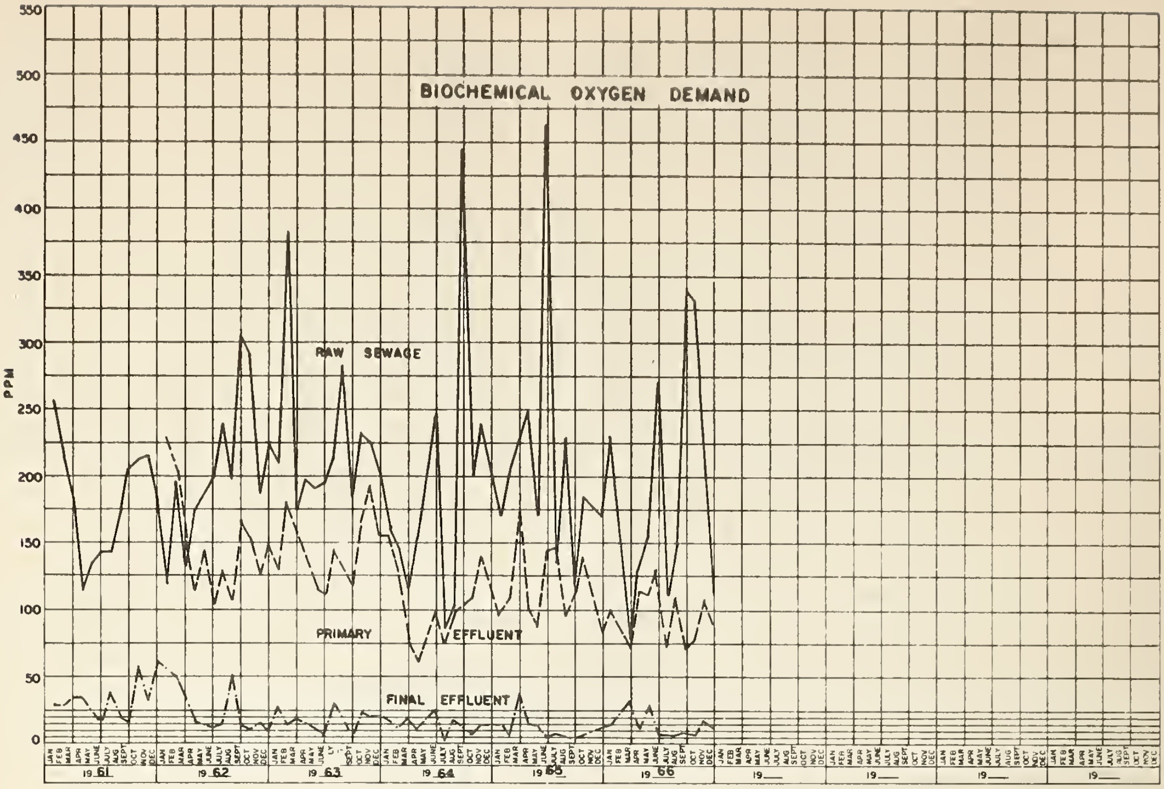

PROBABILITY OF FLOWS
FLOW M.G.D.
10·0
9·0
8·0
7·0
6·0
5·0
4·0
3·0
2·0
1·0
·9
·8
·7
·6
·5
·4
3
2
·1
0.01
0.05
0.1
0.2
0.5
1
2
3
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
PERCENT OF FLOWS EQUAL TO OR GREATER THAN
1963
1964
1965
1966


AVERAGE DAILY FLOWS
M.G.D.
0
0·2
0·4
0·6
0·8
1·0
1·2
1·4
1·6
1·8
2·0
2·2
2.259
2.268
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1958
1959
1960
1961
1962
1963
1964
1965
1966
19

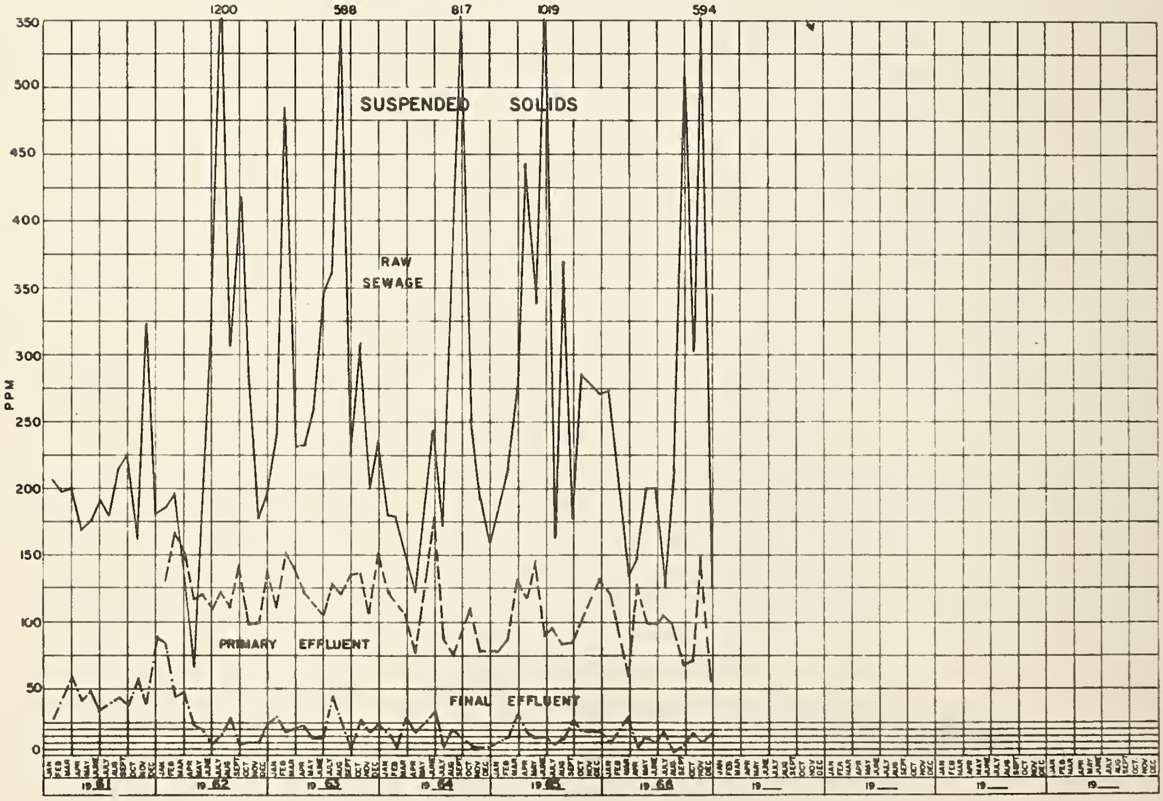


1966 OPERATING RESULTS
(BOD)


1966 OPERATING RESULTS
(SUSPENDED SOLIDS)
RAW SEWAGE
1965 RAW
PRIMARY EFFLUENT
FINAL EFFLUENT
P. P. M.
1000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
15
10
9
8
7
6
5
4
3
2
1
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
% EQUAL TO OR GREATER THAN



MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	INFLUENT P.P.M.	EFFLUENT P.P.M.	% REDUCTION	TONS REMOVED	
JAN.	230	13	94.5	57.1	274	10	96.5	69.5	137
FEB.	* 174	13	92.5	29.0	* 259	13	95.0	44.4	128
MAR.	76	31	59.0	14.0	132	28	79.0	32.2	130
APR.	132	11	91.5	34.0	146	5	96.5	39.6	79
MAY	155	28	82.0	35.9	200	14	93.0	52.6	145
JUNE	270	7	97.5	67.1	200	10	95.0	48.5	137
JULY	110	6	94.5	21.5	128	18	86.0	22.7	133
AUG.	145	5	96.5	31.4	216	4	98.0	47.5	145
SEPT.	340	6	98.0	67.9	548	7	98.5	110.0	148
OCT.	135	5	96.0	26.8	300	18	94.0	58.1	142
NOV.	230	17	92.5	45.3	594	10	98.5	124.8	162
DEC.	96	13	86.5	28.3	110	16	69.0	32.1	114
TOTAL	-	-	-	477.7	-	-	-	729.9	1600
AVG.	174	13	92.5	39.8	259	13	95.0	60.8	133

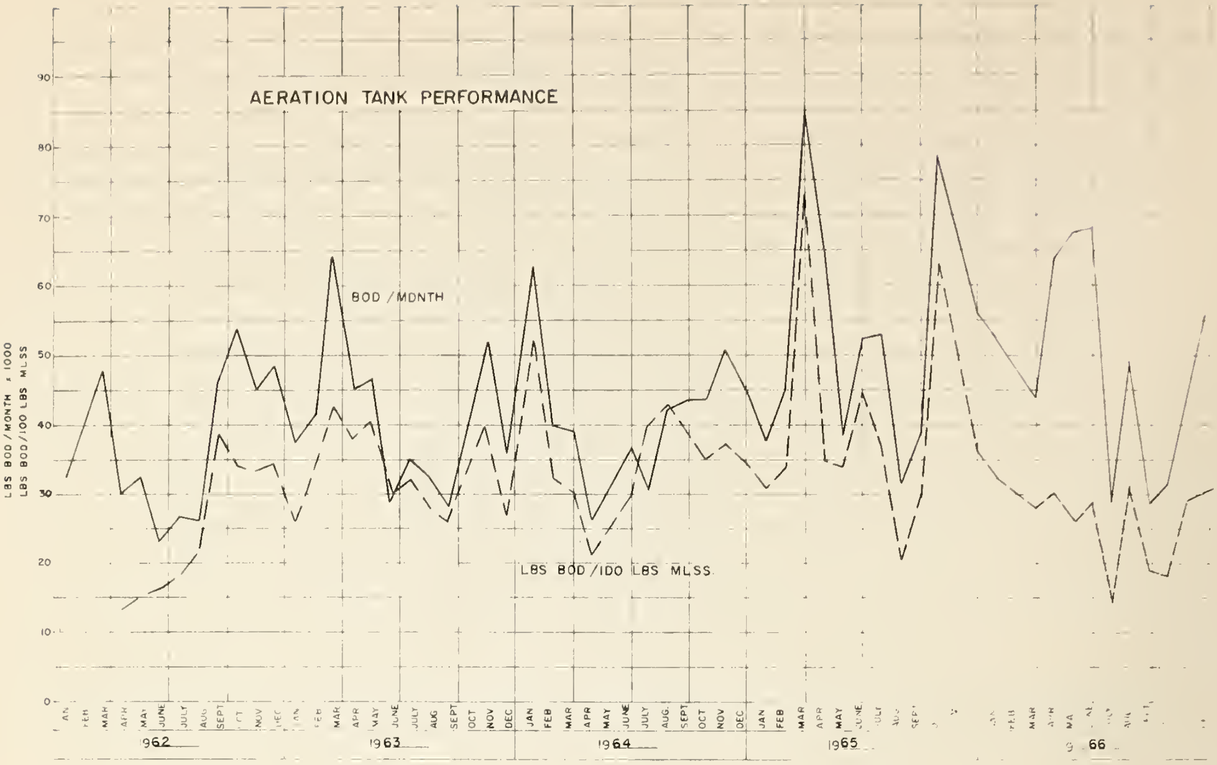
* AVERAGE VALUE SUBSTITUTED; NO SAMPLE

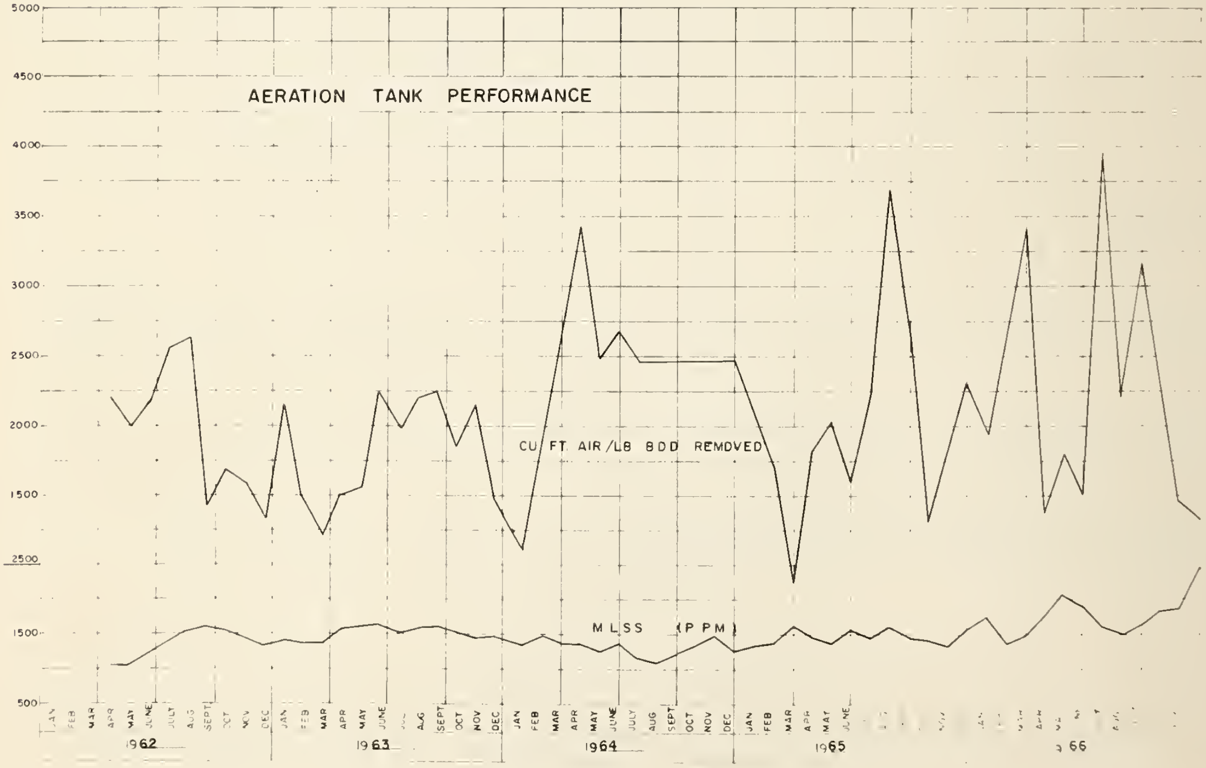
COMMENTS

Raw sewage having an average strength of 174 ppm in BOD and 259 ppm in SS was treated in 1966. The average BOD and the average suspended solids in the final effluent were both recorded at 13 ppm, falling within OWRC objectives of 15 ppm.

The average removal efficiencies of 92.5% for BOD and 95% for suspended solids are most satisfactory for this type of treatment.

A total of 1600 cubic feet of grit was removed, giving an average of 2.7 cubic feet of grit removed per million gallons treated.


AERATION TANK PERFORMANCE
BOD / MONTH
LBS BOD / 100 LBS MLSS
LBS BOD / MONTH x 1000
LBS BOD/100 LBS MLSS
0
10
20
30
40
50
60
70
80
90
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1962
1963
1964
1965
1966


AERATION TANK PERFORMANCE
CU FT AIR / LB BOD REMOVED
MLSS (PPM)
5000
4500
4000
3500
3000
2500
2000
1500
2500
1500
500
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1962
1963
1964
1965
1966

AERATION SECTION

MONTH	PRIM. EFFL B.O.D. P.P.M.	M.L.S.S. P.P.M.	LBS. B.O.D. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. B.O.D. REMOVED
JANUARY	100	1749	32	1961
FEBRUARY	–	1422	–	–
MARCH	71	1519	28	3452
APRIL	114	1783	30	1380
MAY	120	2113	26	1813
JUNE	134	1957	29	1530
JULY	70	1641	14	3993
AUGUST	110	1510	31	2244
SEPTEMBER	70	1688	19	3204
OCTOBER	76	1864	18	2505
NOVEMBER	106	1704	29	1483
DECEMBER	82	1981	30	1183
TOTAL	–	–	–	–
AVERAGE	96	1744	26	2250

COMMENTS

The average primary effluent BOD was 96 ppm in 1966 and the average MLSS concentration was 1744 ppm which resulted in a loading of 26 lbs. of BOD per 100 lbs. of MLSS. An average of 2250 cubic feet of air was used per pound of BOD removed. The average BOD load on the aeration section was 1550 pounds per day.

DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS		
	1000'S CU FT	% SOLIDS	% VOL MAT	1000'S CU. FT	% SOLIDS	% VOL. MAT
JAN	56.54	3.13	-	33.37	2.11	-
FEB	49.86	-	-	31.43	-	-
MAR	48.57	4.45	-	24.30	1.77	-
APR.	47.05	3.52	-	25.27	4.07	-
MAY	46.89	5.76	-	16.85	4.03	-
JUNE	54.68	3.63	2.65	34.13	1.83	1.20
JULY	43.08	4.94	3.71	27.03	2.74	1.70
AUG.	51.79	1.45	-	30.08	3.65	2.18
SEPT.	44.15	4.09	3.09	30.46	3.86	2.33
OCT.	48.48	3.95	3.03	31.21	3.03	1.92
NOV.	47.00	6.67	2.65	32.07	2.67	1.76
DEC.	46.78	4.08	2.90	35.32	4.06	2.56
TOTAL	584.87	-	-	351.52	-	-
AVG.	48.74	4.15	3.00	29.29	3.08	1.95

COMMENTS

During the year a total of 584,874 cubic feet or 3.66 million gallons of raw sludge was pumped to the digesters. At an average concentration of 4.15 percent solids. this represents a total of 1,520,000 pounds of solids.

A total of 351,520 cubic feet or 2.19 million gallons of digested sludge was removed from the digesters. Sludge disposal was by tank truck haulage.

The volatile reduction was approximately 55 to 60 percent during the year, which indicates a good digester operation.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (P.P.M)
JANUARY	52.658	2550	4.84
FEBRUARY	36.096	2250	6.23
MARCH	62.035	2720	4.38
APRIL	56.212	2086	3.71
MAY	56.589	2175	3.84
JUNE	51.038	2230	4.37
JULY	41.320	3420	8.28
AUGUST	44.813	3200	7.14
SEPTEMBER	40.686	3400	8.36
OCTOBER	41.200	2891	7.02
NOVEMBER	42.512	3000	7.06
DECEMBER	68.286	3140	4.60
TOTAL	593.445	33062	-
AVERAGE	49.454	2755	5.57

COMMENTS

The final effluent was chlorinated through the whole year and a total of 33.062 pounds of chlorine was used. The average chlorine dosage was 5.57 ppm for the year.

CONCLUSIONS

The average hydraulic and organic loads are at approximately the design capabilities of the plant and exceed them a good percentage of the time. The plant performance during the year was satisfactory in view of the loading experienced.

RECOMMENDATIONS

Recommendations are not included pending a consulting engineer's report on water and sewage works requirements for the central portions of the County of York.

ONTARIO WATER RESOURCES COMMISSION